

## **DETAILED ACTION**

### ***Comments***

1. The Amendment – After Non-Final Rejection filed on June 24, 2008 has been entered and made of record.

### ***Claim Objections***

2. Claim 11 is objected to because of the following informalities:
  - Line 1: “the diagnostic imaging apparatus” should be -- The diagnostic imaging apparatus --

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim limitation “the plurality of images are

taken during a single sitting” in lines 1-2 does not contain proper support in the originally filed specification.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3, 5, 6 and 9-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Lang et al. (U.S. Pat. No. 7,184,814).

Re claim 1: Lang et al. disclose a diagnostic imaging apparatus (Computer, Col. 29 lines 49-60) comprising: a position-of-interest determination unit (“Point Cluster-Technique”) which determines a plurality of positions (“marker's local coordinates”) in a plurality of images (“X-ray or CT scan images taken at different times *t*”) of a predetermined part (“joint”) of an object which are taken during the movement (“subject performing activity ... joint motion”) of the predetermined part, to be positions of interest in the plurality of images, where the plurality of positions in the plurality of images correspond to a predetermined position in the

predetermined part (Col. 34 line 18 through Col. 35 line 36); a characteristic-quantity calculation unit which calculates a characteristic quantity ("Angular Movement") indicating a positional relationship between the positions of interest in the plurality of images (Col. 36 lines 1-59); and an automatic diagnosis unit ("PC") which outputs information ("Computer Readout") on said predetermined part of said object, based on said characteristic quantity (Col. 29 lines 49-60. It should be understood that the method describe throughout the Specification, states that the markers are utilized during the movement of a human joint, such as a knee, and a computer readout shows a cartilage thickness map of the degenerated cartilage. In addition, the method is provided for aiding in assessing the condition of cartilage in a joint of a mammal.).

Re claim 3: Lang et al. disclose said predetermined part is a joint of a human body ("Joint of a patient", Col. 15 lines 6-14).

Re claim 5: Lang et al. disclose said plurality of images are a plurality of radiographic images which are taken by applying radiation ("MRI, CT, Ultrasound imaging techniques, X-ray") to said predetermined part during the movement of the predetermined part ("Gait Analysis", Col. 31 line 48 through Col. 32 line 48).

Re claim 6: Lang et al. disclose a marker is attached to said predetermined part (FIG. 18A), said plurality of images are a plurality of radiographic images ("MRI,

CT, Ultrasound imaging techniques, X-ray"), and said position-of-interest determination unit determined the positions of images of said marker to be said positions of interest, where said images of the marker are respectively formed in said plurality of radiographic images by radiation which has passed through the marker (Col. 34 line 18 through Col. 35 line 36, Col. 42 line 61 through Col. 43 line 16).

Re claim 9: Lang et al. disclose at least three images are taken during the movement of the predetermined part ("Gait Analysis Activities", Col. 32 lines 30-48).

Re claim 10: Lang et al. disclose the diagnostic imaging apparatus is an automatic diagnostic imaging apparatus ("a computer ... produces a computer readout", Col. 29 lines 48-60).

Re claim 11: Lang et al. disclose the diagnostic imaging apparatus is a radiographic imaging apparatus (The computer used for aiding in the assessment of the condition of the cartilage uses MR image data, see Col. 29 lines 43-47).

Re claim 12: Lang et al. disclose the information is at least one of information indicating whether the predetermined part is normal, information indicating a degree of abnormality of the predetermined part, and the characteristic quantity

(Once the angular movement of the markers are measured, this data is utilized to determine the condition of the part in question, see at least Col. 22 lines 19-42, Col. 24 lines 1-9, Col. 31 line 48 through Col. 32 line 48, Col. 34 line 18 through Col. 36 line 46.).

Re claims 13 and 17: Lang et al. disclose the plurality of images of the predetermined part of the object are taken during movement through at least three positions ("standing still, laying down, walking or running, flexing, etc.") of the predetermined part (Col. 32 lines 30-47).

Re claim 14: Lang et al. disclose the positions of interest are determined after the plurality of images are taken ("Multiple skin reference markers can be placed upon one or more limbs of a patient prior to internal imaging and external imaging.", Col. 20 line 41 through Col. 21 line 10).

Re claims 15 and 18: Lang et al. disclose he automatic diagnosis unit compares the calculated characteristic quantity with a previously stored characteristic quantity for a normal predetermined part and a previously stored characteristic quantity for a diseased predetermined part ("comparing the movement pattern for a joint of a subject being studied with the cartilage degeneration pattern of the subject", Col. 13 lines 24-40).

Re claims 16 and 19: Lang et al. disclose the automatic diagnosis unit outputs information indicating that the predetermined part is normal when the calculated characteristic quantity is close to the characteristic quantity for a normal predetermined part, and the automatic diagnosis unit outputs information indicating that the predetermined part is diseased when the calculated characteristic quantity is close to the characteristic quantity for a diseased predetermined part ("Provide Therapy", Col. 46 line 4 through Col. 48 line 46).

Re claim 20, as understood: Lang et al. disclose the plurality of images are taken during a single sitting ("standing still", Col. 32 lines 30-47).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lang et al. in view of Kido et al. (U.S. Pat. No. 5,732,149). The teachings of Lang et al. have been discussed above.

As to claims 7 and 8, Lang et al. does not explicitly disclose said plurality of radiographic images are taken by using a solid-state radiation detector which generates

and stores electric charges when the solid-state radiation detector is irradiated with radiation.

Kido et al. teaches said plurality of radiographic images are taken by using a solid-state radiation detector (FIG. 4, "Radiation Image Conversion Panel 4") which generates and stores electric charges when the solid-state radiation detector is irradiated with radiation (Col. 7 lines 5-26).

Therefore, in view of Kido et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lang et al. by incorporating the radiation conversion panel which accumulates energy when irradiated with radioactive rays in order to provide an enhancement in image extraction and create a latent image of the part of the human body exposed to radiation (Col. 6 lines 1-4 and Col. 7 lines 15-26).

#### ***Allowable Subject Matter***

9. Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the closest prior art made of record fails to teach or suggest the plurality of images are obtained at intervals of 0.5 micrometers of movement by the predetermined part.

***Response to Arguments***

***Claim Objections***

10. Claim 4 has been cancelled. Therefore, the objection has been withdrawn.

Claim 12 has been amended to recite, "wherein the information comprises at least one of information" in order to correct typological error. Therefore, the objection has been withdrawn.

***Claim Rejections under 35 U.S.C. §102 and 103***

11. Applicant's arguments with respect to claims 1, 3 and 5-13 have been fully considered but they are not persuasive. Applicant alleges that Lang fails to indicate that information on a predetermined part is outputted from an automatic diagnosis unit based on the movement (Remarks, Page 8 lines 8-10). Also, that Lang does not have a unit which determines which positions are positions of interest in an object during the object's movement (Remarks, Page 8 lines 16-17). And that Lang does not teach the multiple position radiological information as described by claims 4-8 (Remarks, Page 9 lines 1-2). Examiner respectfully disagrees.

Lang et al. teaches assessing the condition of a joint of a mammal, particularly a human subject, using the assessment to treat and monitor the subject as needed for cartilage degeneration problems. The system used in Lang et al. utilizes a computer system to analyze images ("cartilage image data", "bone image data", and "opto-electrical image data", Col. 41 lines 60-67). The images are taken while moving a joint of the human body, and prior to taking the images, markers are placed on the human



skin in order to provide a reference baseline for comparison. The moving images can be used to provide a visual indication of potential or actual cartilage defects and help in determining their relation between movement and degeneration patterns (Col. 14 lines 1-45). Also, the 3D coordinates for each marker is determined using a Point Cluster Technique (Col. 34 lines 18-67).

Once these positions are determined they are related to the limb segment system and can be used to describe joint motions. The motion that is of interest is how the femoral condyles move with respect to the tibial plateau. Flexion/Extension angles are also calculated (Col. 35 line 29 through Col. 36). All the data acquired is conveniently used to provide therapy, for example, a tibial osteotomy can be simulated in the manner and the optimal degree of angular correction with regard to biomechanical loading conditions of normal and diseased cartilage can be determined before the patient undergo surgery (Col. 46 lines 5-58). Finally, there is also disclosed and embodiment wherein biochemical parameters and video cameras are used to assess the joint's condition, but the use of MRI, for example, is used to obtain the cartilage image data, wherein the markers are also present (Col. 41 line 60 through Col. 42 line 23).

Therefore, Lang et al. does disclose a position-of-interest determination unit, a characteristic-quantity calculation unit and automatic diagnosis unit as claimed. Thus, the rejections are maintained.

**Conclusion**

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Au disclose Motion Analysis System Employing Various Operating Modes.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSE M. TORRES whose telephone number is (571)270-1356. The examiner can normally be reached on M-F: 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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